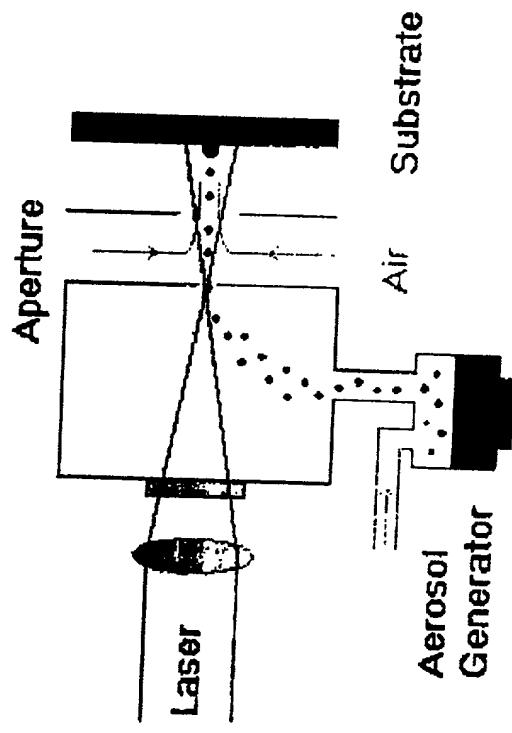


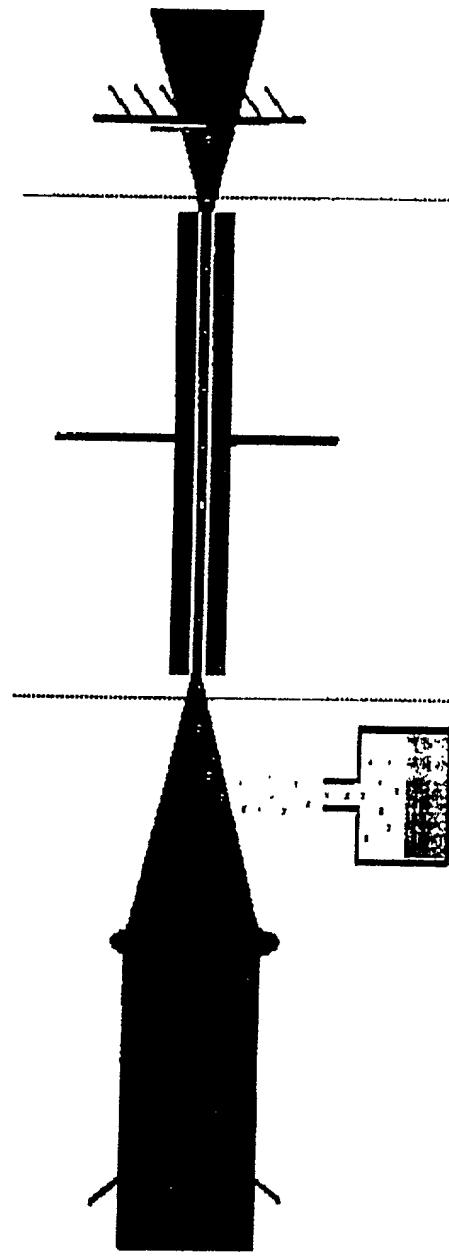
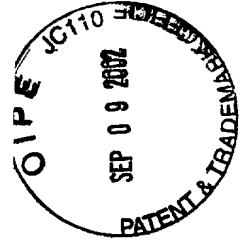
2005050 "5022400



### Features

- High Velocity ( $\sim 10 \text{ m/s}$ )
- Variable Beam Diameter ( $10 \mu\text{m}$ )
- High Throughput ( $\sim 10^9 \text{ s}^{-1}$  in  $100 \mu\text{m}$  beam)
- Reduced Clogging
- Long Working Distance ( $\sim$  few cm)
- Simultaneous Laser Treatment

FIG. 1



### Aerosol Generation

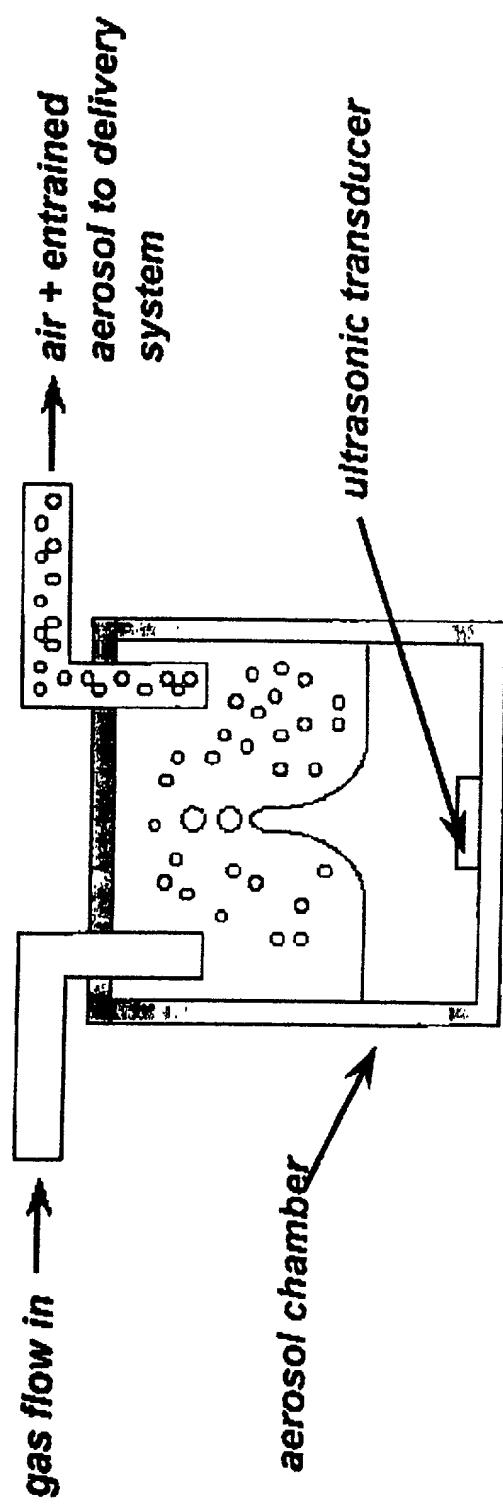
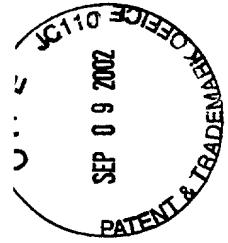
### Particle Delivery

### Laser Processing

### Features

- Small droplets ( $\sim 1 \mu m$ )
- Dense aerosols ( $\sim 10^{16} m^3$ )
- Accuracy to  $3 \mu m$
- Single particle to  $10^9$  particles/s
- Throughput to  $0.25 mm^3/s$
- Low power ( $\sim 50 mW$ )
- High scan rate ( $\sim 1 m/s$ )
  - Dense, conductive materials ( $\rho \sim 2x$  bulk)

FIG. 2

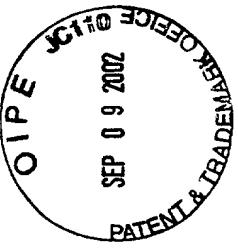
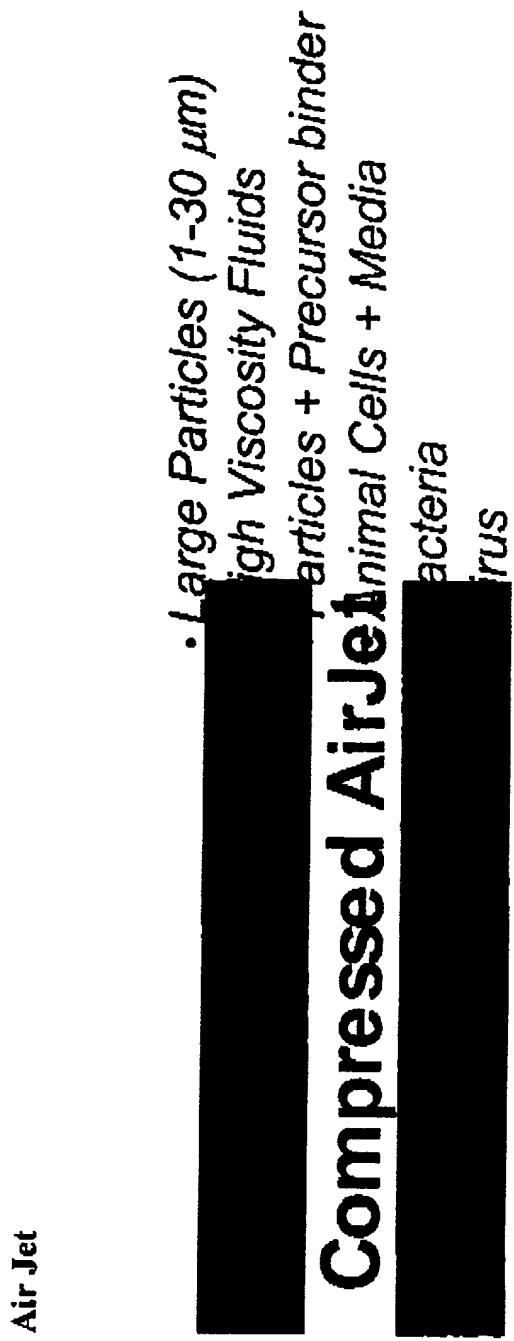


- Small droplets ( $\sim 1 \mu\text{m}$ ,  $1 \text{ fL}$ )
- Dense aerosols ( $\sim 10^{16} \text{ m}^{-3}$ )
- $100 \mu\text{L}$  minimum sample
- All solids, all precursors, or solid/precursor mixtures
- Precursor based alloys with atomic scale mixing
  - Organic and biological entities in droplets (enzymes, proteins, virus, etc.)

FIG. 3

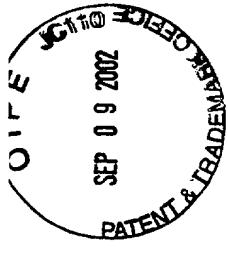
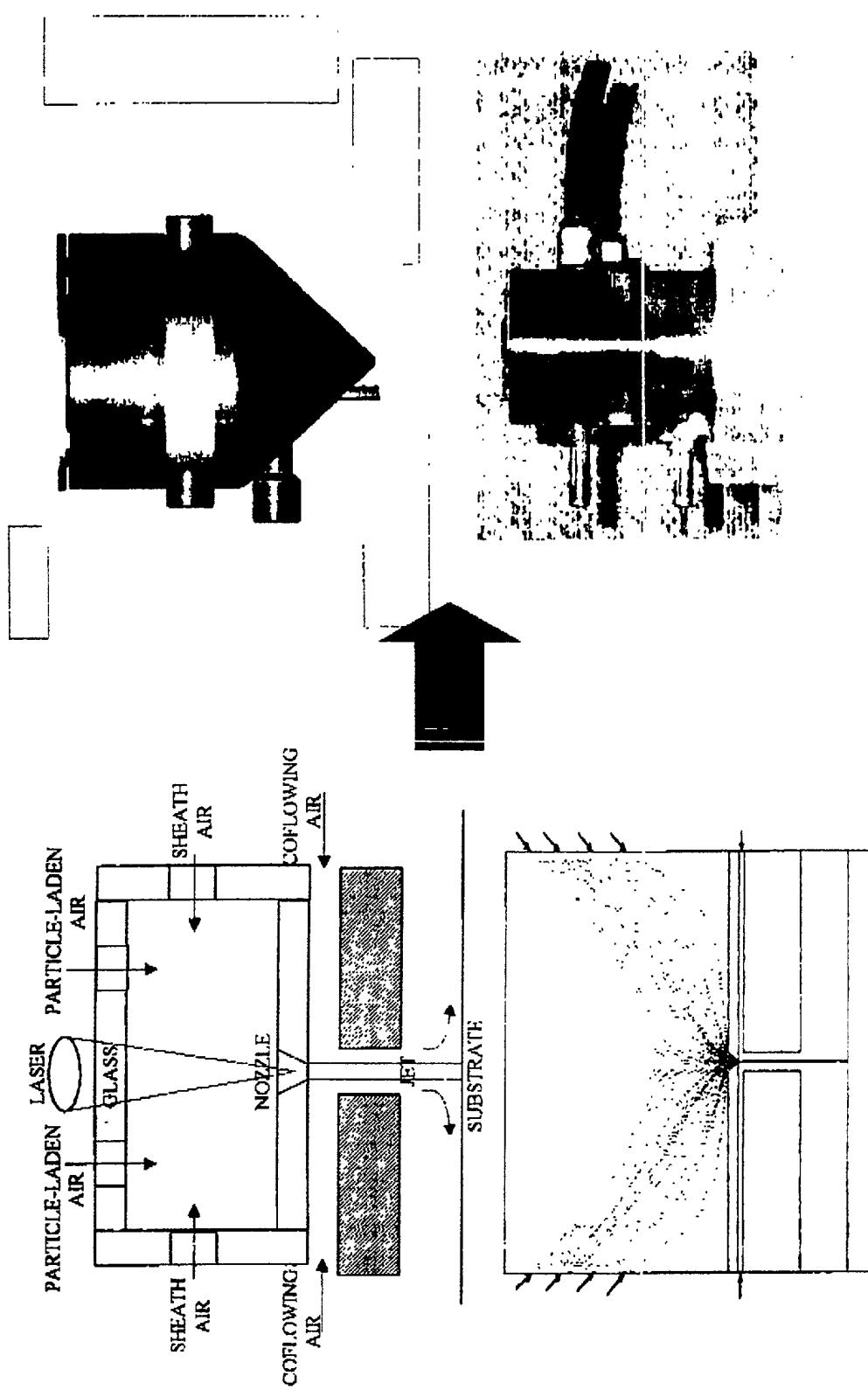
FIG. 4

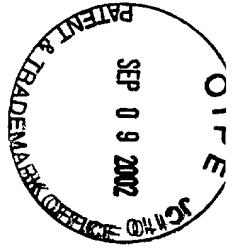
*Particulate in Suspension*



20000000000000000000000000000000

FIG. 5





### Cascade Impaction

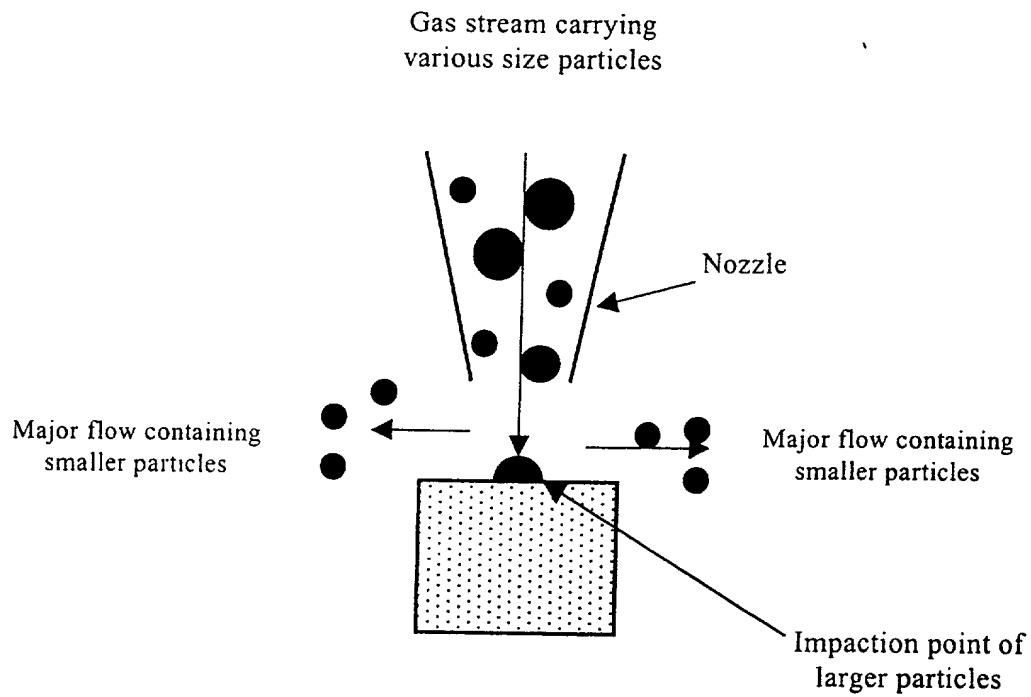
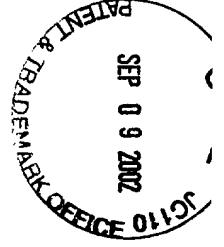


FIG. 6



Virtual Impactor

Gas stream carrying  
various size particles

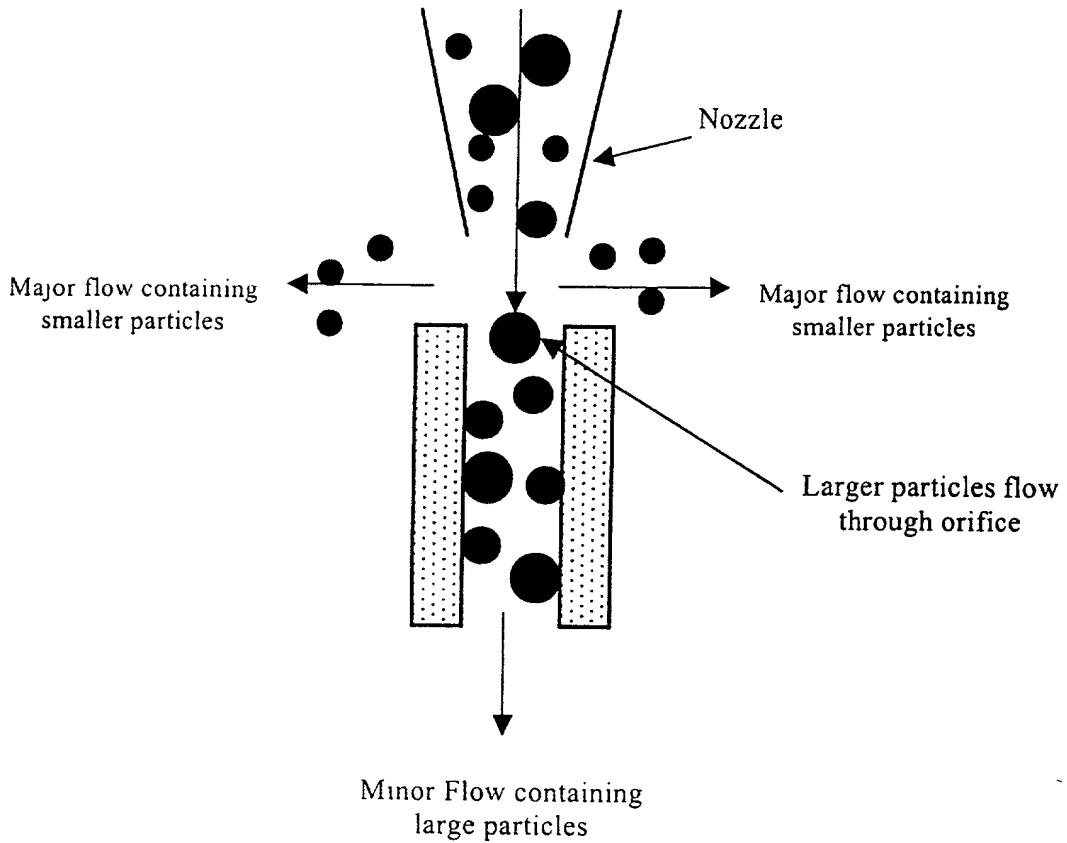
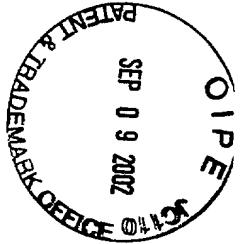


FIG. 7



### Virtual Impactors in Series

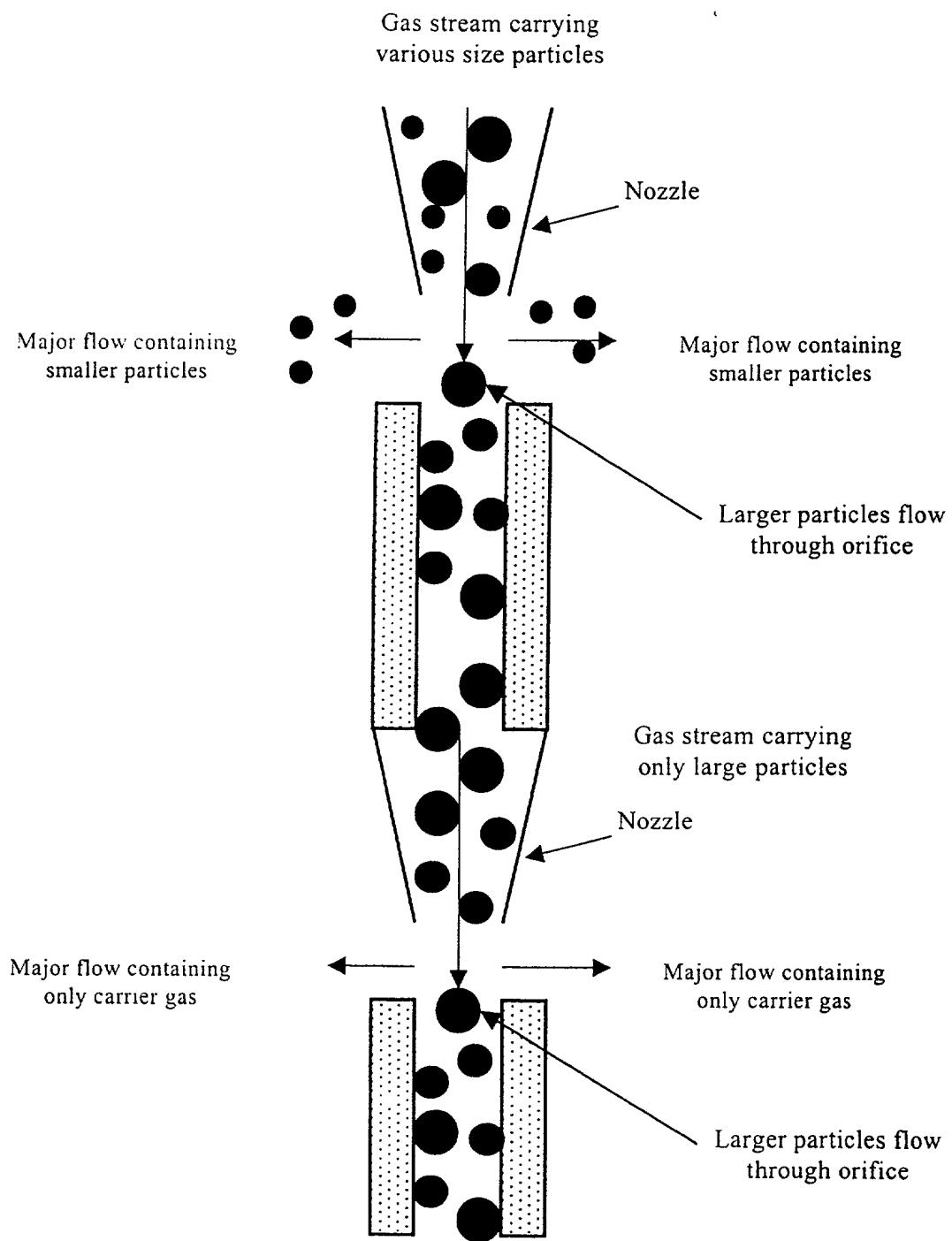
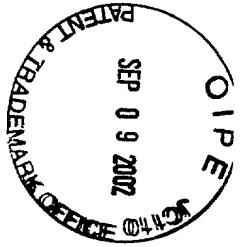


FIG. 8



Particle Sorting at Atomization Unit  
& Virtual Impactors in Series

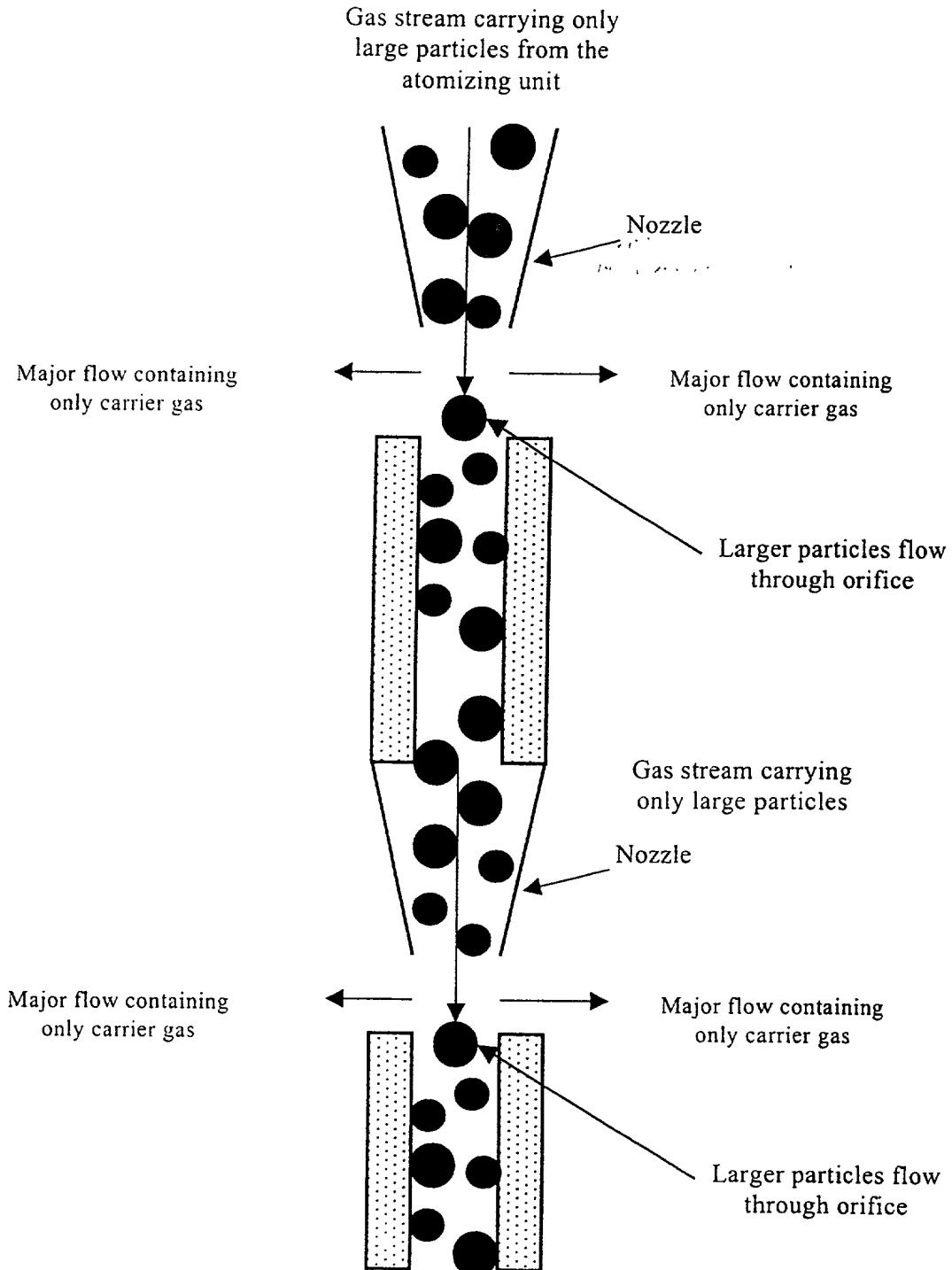


FIG. 9

## Flow Guidance Delivery System

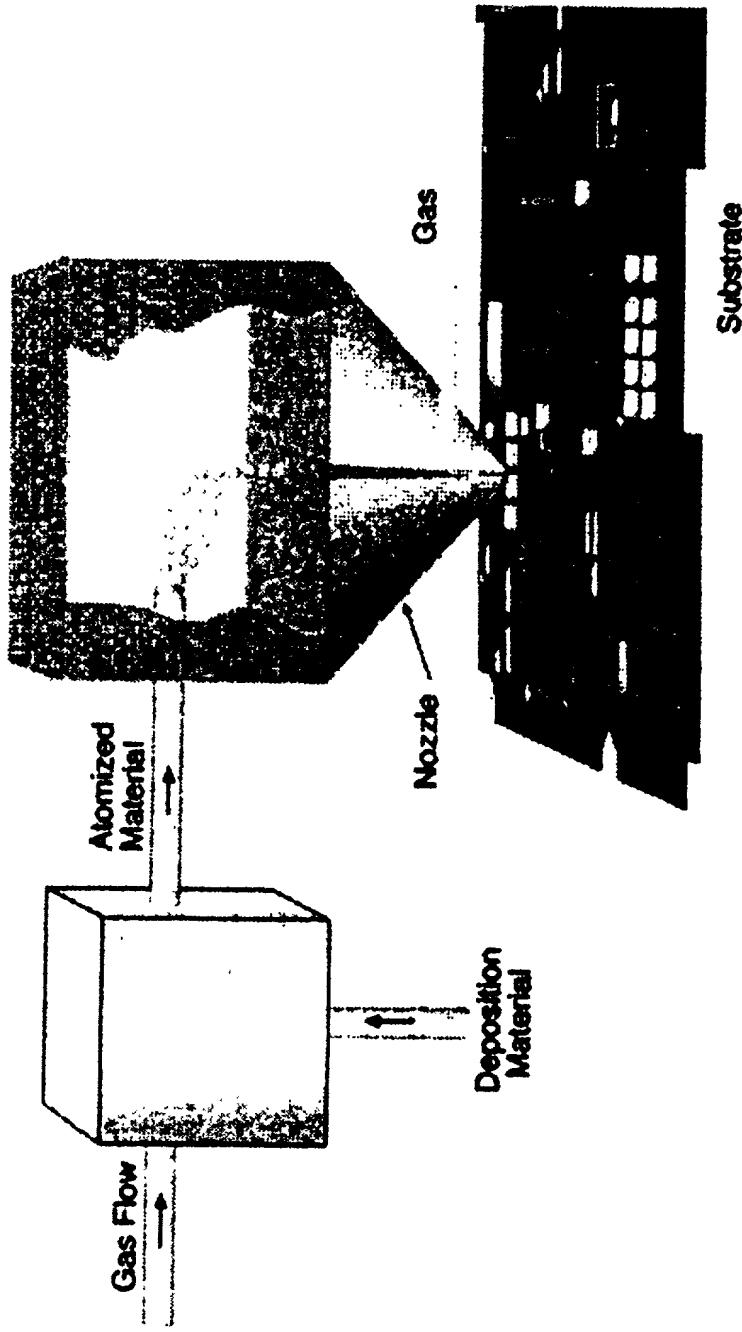
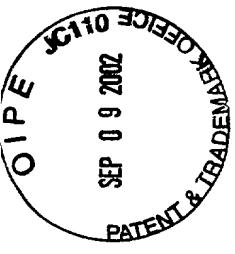


FIG. 10



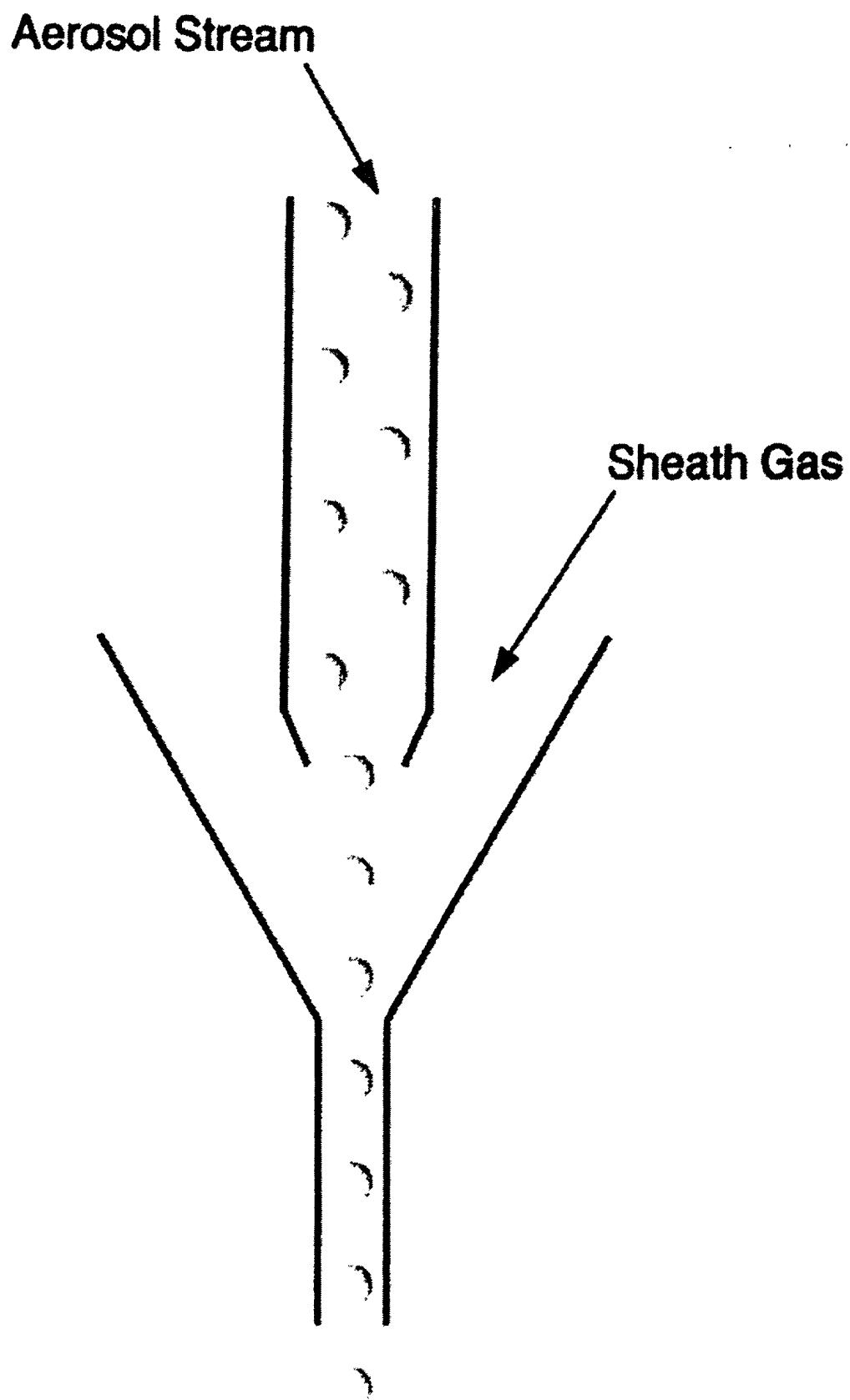
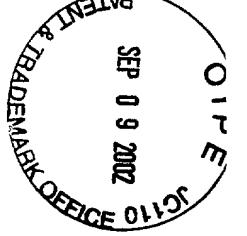


FIG. 11

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FIG. 12

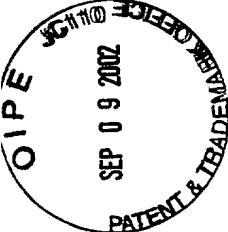
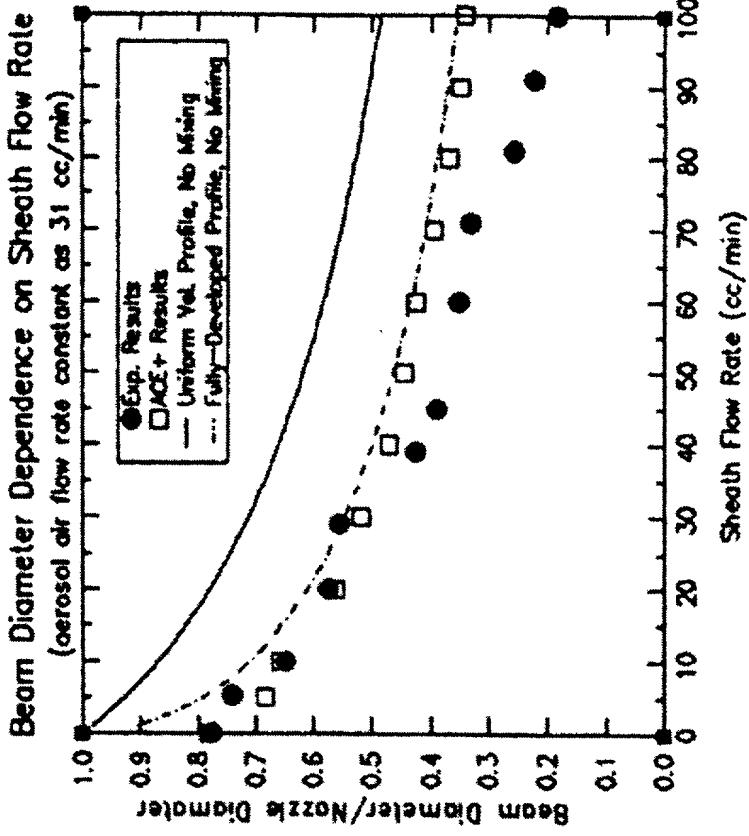
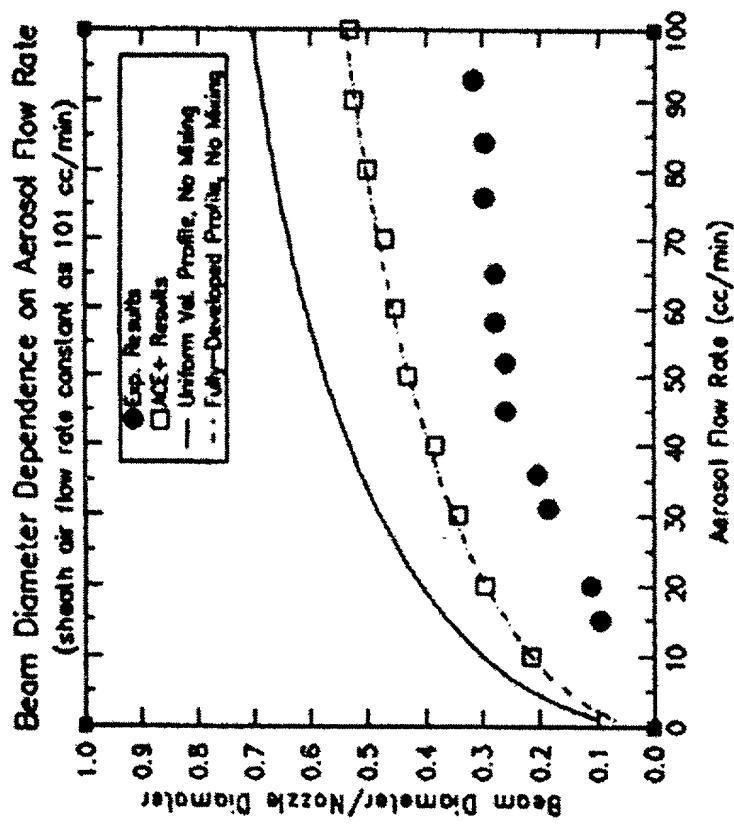
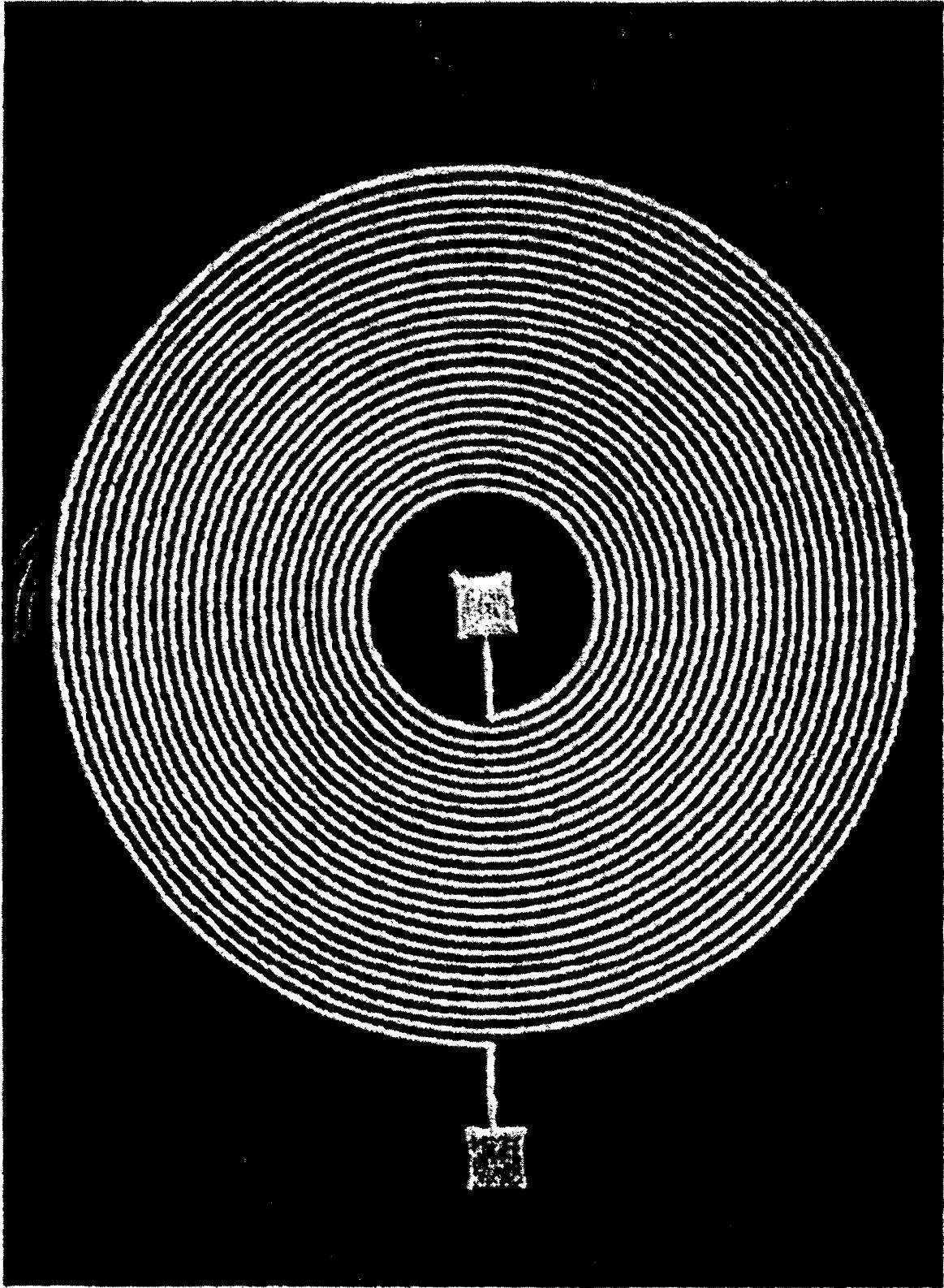


FIG. 13



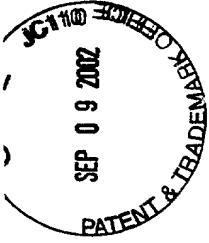
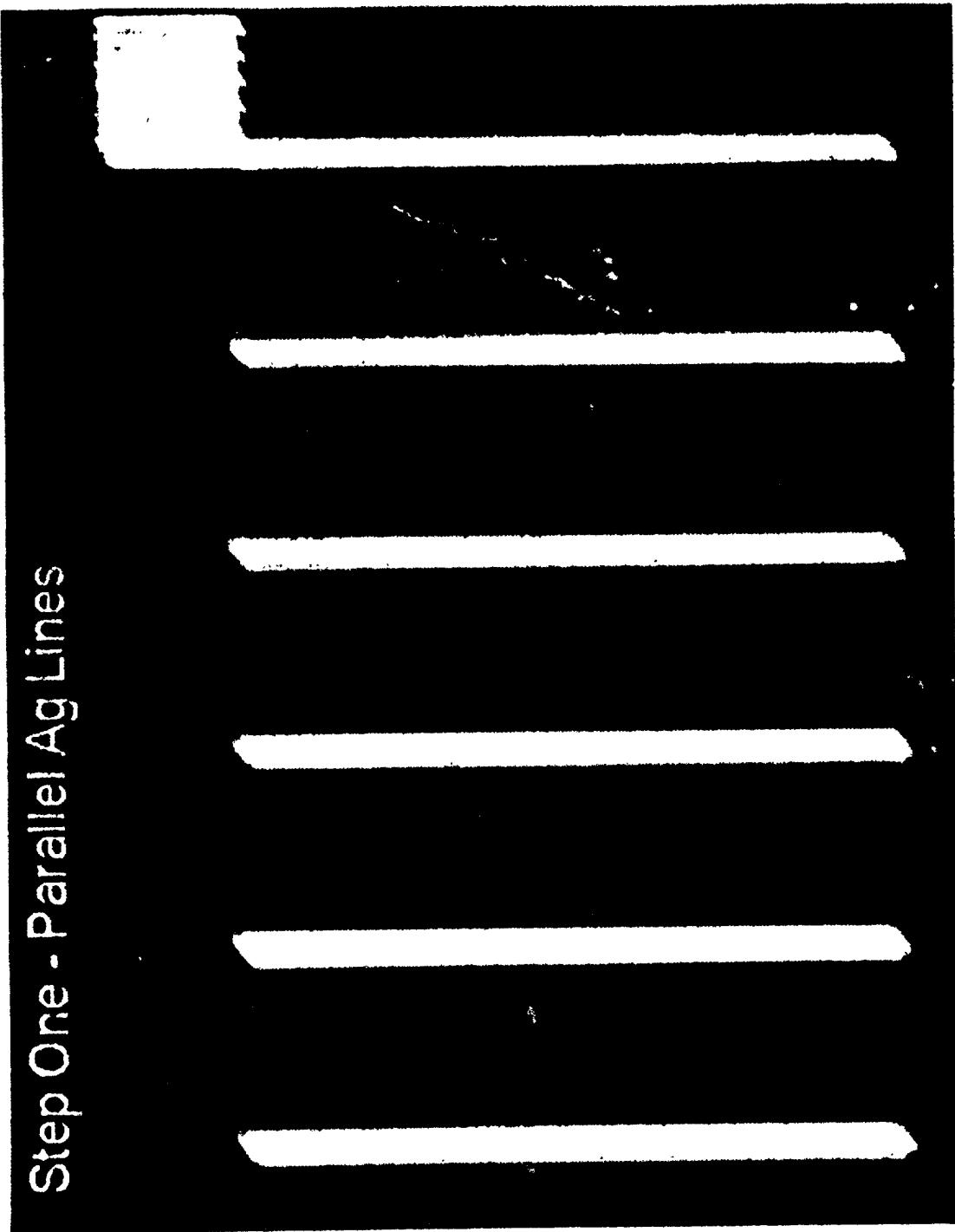
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SEP 09 2002

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FIG. 14

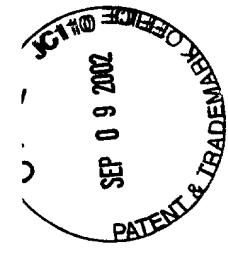
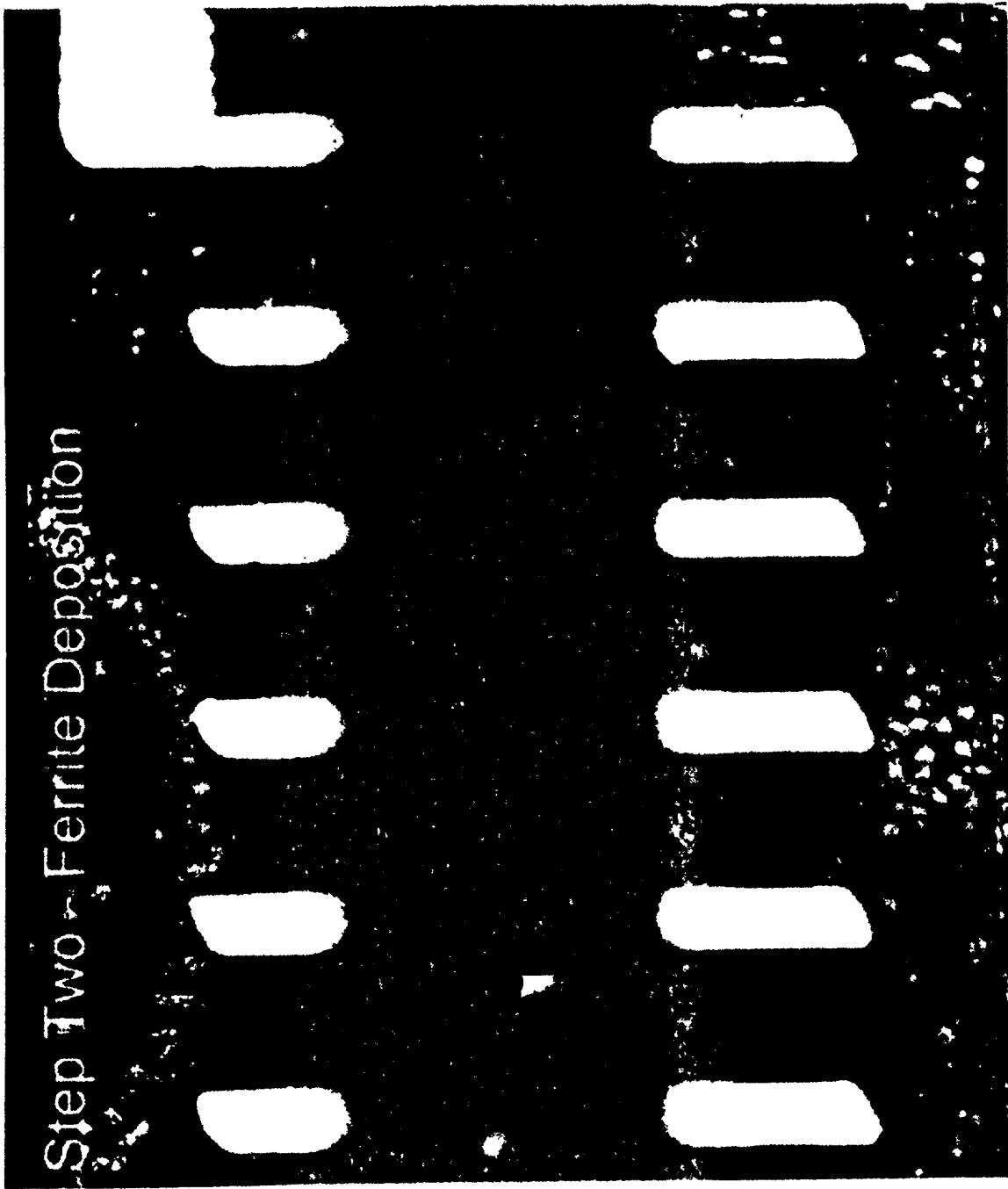
Step One - Parallel Ag Lines



200060 " 5032400 T

FIG. 15

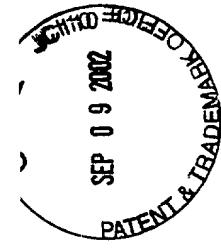
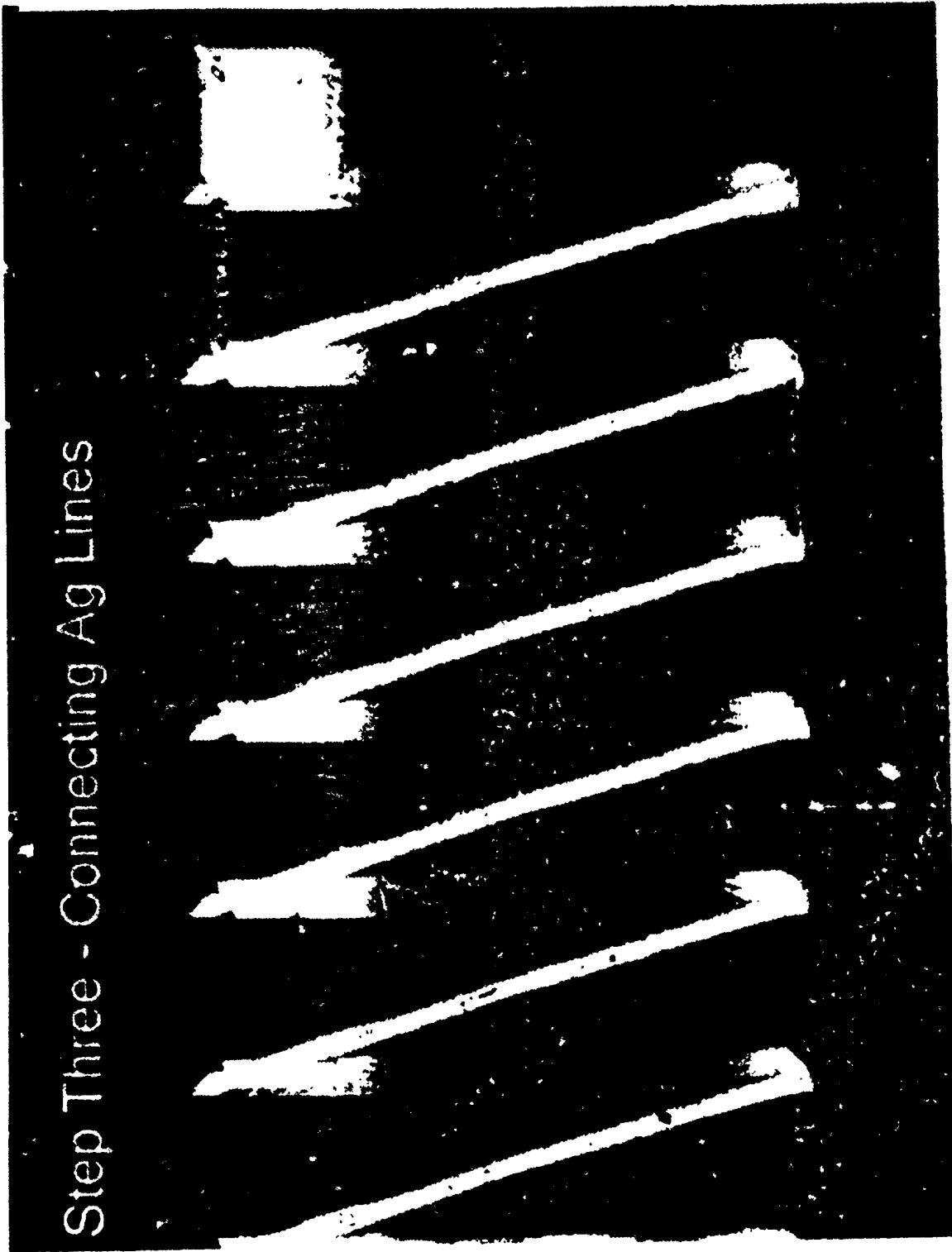
Step Two - Ferrite Deposition



200060 \* 5022400 T

FIG. 16

Step Three - Connecting Ag Lines



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FIG. 17

